CONSULTANTS GROUP

GEOLOGY ENGINEERING ENVIRONMENT HYDROLOGY

May 8, 1991

Mr. Lyle Stott
Engineer
Utah Bureau of Water Pollution Control
288 North 1460 West
Salt Lake City, Utah 84116-0690

RE: Clay Liner Investigation Methods - Tenneco Minerals Company Goldstrike Mine Barren Solution Pond

Dear Mr. Stott:

At the request of Ms. Debra Brannum of Tenneco Minerals Company, we are providing the Bureau with a brief description of the methods used and reasoning behind these methods for the investigation of the release of leach solutions to the clay liner in the Goldstrike Mine's barren solution pond.

Since the sampling methodology used in the investigation of the release from the leach pad #1 sump area were found to effective, the general methods of clay liner investigation employed there were al;so used for the barren pond. A brief review of construction conditions, revealed that the pond was constructed entirely on engineered fill material and that the pre-construction terrain could not be expected to result in any localized differential significant settlement or compaction. In addition, a review of the engineering testing data for the pond foundation revealed that the construction specifications were met. The foregoing factors resulted in the conclusion that there are no definable sites or zones that would result in differential settlement or compaction within the pond foundations. The criteria for sample site selection were determined to be observable liner wetness or
moistness and adequate and representative coverage of the entire surface area of the pond bottom.

The sites chosen for sampling are shown on the attached sketch location map. Sites #1 through #5 were clustered near the southwest corner of the pond in the vicinity of the leak detection sump and where the greatest hydraulic head would have developed in the leak detection system. The remaining samples were arrayed across the pond bottom to assess moisture impacts up-slope from the sump. Evidence of wetness or excessive moisture

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in the clay liner was detected by carefully walking over the pond bottom. As was learned during the leach pad #1 investigation, wetness in clay beneath FML is readily noted underfoot. Detectable wetness was concentrated in the vicinity of the sump. The eleven sample sites provide a sufficient number of samples to adequately assess the presence of contaminants in the clay liner which could have resulted from leakage of cyanide solutions through the FML. The sampling is not meant to be representative of the overall clay liner since it was purposely skewed toward areas of most probable contamination as evidenced by wetness.

At each sample site a 4 to 5 inch square of FML, geogrid, and geofabric was cut away to expose the clay liner. Sampling was accomplished using a soil auger. Samples were taken continuously approximately every 6 inches. Augers were thoroughly cleaned between samples. Each bore hole was advance until auger refusal was reached. Hole depths ranged from 12 to 18 inches. Boreholes were plugged with bentonite. Samples were placed in wide-mouthed plastic bottles, cooled, and submitted for laboratory analysis for total and WAD cyanide, Au, Ag, and Zn. The three metals were chosen because they may be expected to be present in the recycled leach solutions and are less likely to be found in naturally high concentrations in the clay, as would be the case with many other metals.

A report of the results of the investigation will be provided after all of the laboratory results are received.

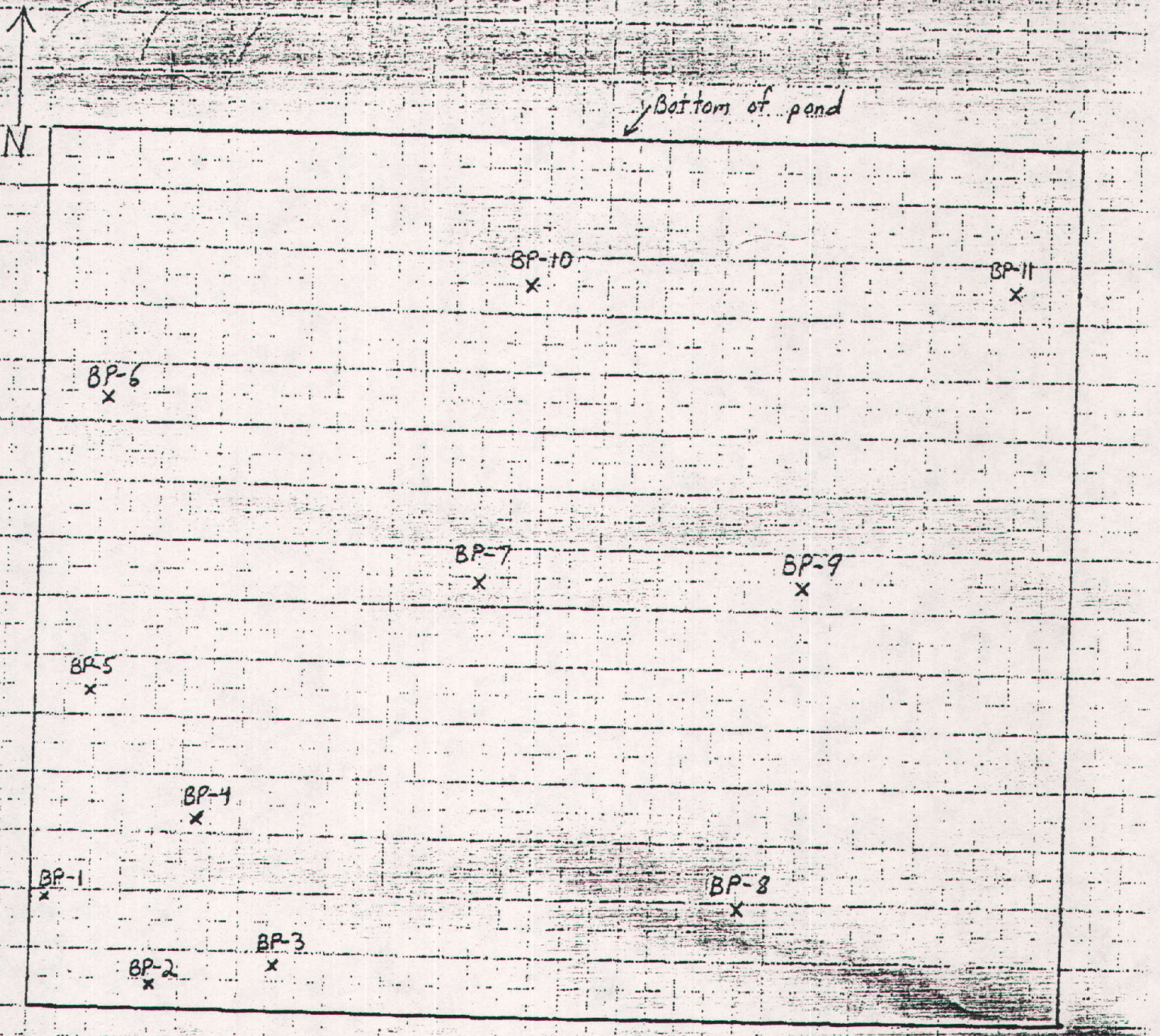
Sincerely,

R Bayer /RJB.

Robert J. Bayer
Vice President

Tenneco - Goldstrike Mine, Barren Solution Pond

Sampling Points



Scale 1" = 10'